WE CLAIM:

1. A force sensor measuring applied forces, comprising;

a first member;

a second member, wherein the first member is positioned nearby to the second member;

a flexure, the flexure connecting the first member and the second member, wherein the flexure supports the first member with respect to the second member and allows the first member to move relative to the second member along two axes; and

a readout mechanism measuring the displacement of the first member relative to the second member, wherein the applied forces are determined from the displacement of the first member relative to the second member .

2. The invention of claim 1 wherein the first member comprises an inner member and the second member comprises an outer member.

3. The invention of claim 1 wherein the readout mechanism comprises an optical electronic device.

4. The invention of claim 1 wherein the readout mechanism comprises an inductive readout device.

5. The invention of claim 1, further comprising:

a graspable handle, the graspable handle connected to the first member.

6. The invention of claim 5 wherein the handle is integrally formed with the first member.

7. The invention of claim 1, further comprising:

a printed circuit board comprising the readout mechanism, the printed circuit board positioned on one of the members and reading the relative displacement of the two members

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8. The invention of claim 1 wherein the flexure comprises:

a plurality of strips of materials of substantially equal dimension, wherein the strips of materials are adapted to connect to each other to form the flexure.

9. The invention of claim 8 wherein the strips of material have an aspect ratio of approximately 30:1.

10. The invention of claim 8 wherein the strips of material are formed in an L-shape.

11. The invention of claim 1 wherein the material comprising the flexure comprises a plastic material.

12. The invention of claim 1 wherein the material comprising the flexure comprises a spring steel material.

13. A flexure capable of complying with applied forces, comprising:

a first strip of material, and

a second strip of material, wherein the first strip of material is adapted to connect to the second strip of material to form the flexure element, and the flexure element is connected to a first member and a second member to allow a relative displacement between the first member and the second member and the first and second strips of material have a width that is at least twice its thickness.

14. The invention of claim 13 wherein the first and second strips of material comprise substantially equal dimensions.

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15. The flexure element of claim 13 wherein the first and second strips of material are formed into L-shaped strips of material.

16. The invention of claim 13 wherein the strips of material comprise a plastic material.

17. The invention of claim 13 wherein the strips of material comprises spring steel material.

18. The flexure of claim 13 wherein the dimensions of the L-shaped strips of material comprises length L, thickness t, and height or depth w, determine the compliance of the flexure.

19. The invention of claim 18 wherein the width w of the strip of material is approximately 30 times the thickness t of the material.

20. An optical method of measuring forces applied along an axis, comprising the steps of:

applying a force;

emitting light from a light source;

displacing the light source and a sensor element a distance relative to a reflective surface in proportion to the applied force;

sensing the reflection of the emitted light off the reflective surface with the sensor element; and

generating an output voltage from the sensor element, wherein the output voltage is proportional to the applied force.

21. The method of claim 20 further comprising the steps of:

determining the force as a function of the output voltage.

22. The method of claim 20 further comprising the step of:

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stabilizing the emitted light from the light source.

23. The method of claim 22 wherein the step of stabilizing uses feedback from the emitted light from the light source.

24. An optical system from determining an applied force comprising:

a moveable member which is displaced by the applied force;

a light source mounted to the moveable member;

a photodiode mounted to the moveable member;

a light reflective surface receiving light from the light source, wherein the light from the light source is reflected from the reflective surface and detected by the photodiode, and wherein the displacement of moveable member results in a different amount of reflected light to be detected by the photodiode; and

circuitry to determine the applied force according to the light detected by the photodiode.

25. An inductive method of measuring forces applied along an axis, comprising the steps of:

applying a force;

driving a transmitter pattern of wires with an excitation signal;

displacing the transmitter pattern of wires relative to a receiver pattern of wires in response to the applied force;

generating an induced voltage in the receiver pattern of wires in response to the relative displacement; and

generating an output voltage signal from the receiver pattern of wires to determine the forces applied.

26. The method of claim 25 further comprising:

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detecting the output voltage signal to generate a signal that is indicative of the displacement and the applied force.

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